PATENT ABSTRACTS OF JAPAN

(11)Publication number : 08-221202

(43)Date of publication of application : 30.08.1996

(51)Int.Cl.	G06F 3/033
	G06F 3/03

|	
(21)Application number : 07-026807	(71)Applicant : BROTHER IND LTD
(22)Date of filing : 15.02.1995	(72)Inventor : YASUI TSUNEO
	YOSHIDA KOICHI

(54) INFORMATION DISPLAY DEVICE

(57)Abstract:

PURPOSE: To provide an information display device which is capable of making a selection item a defined state by making the selection item a selection state by lightly pressing a touch switch with touch means such as fingers and a pen, etc., and further strongly depressing the selection item with one's own will.

CONSTITUTION: This device is provided with a liquid crystal display 22 displaying information on images and characters, etc., and a touch switch 29 which is arranged on the screen of the liquid crystal display 22 and outputs the signal according to the touch operation by the fingers 41. By moving the fingers, bringing into contact with the surface of the touch switch by the fingers 41, making a selection item a selection state and performing a touch operation for the selection item with prescribed touch strength or more, the selection item is made a defined state.
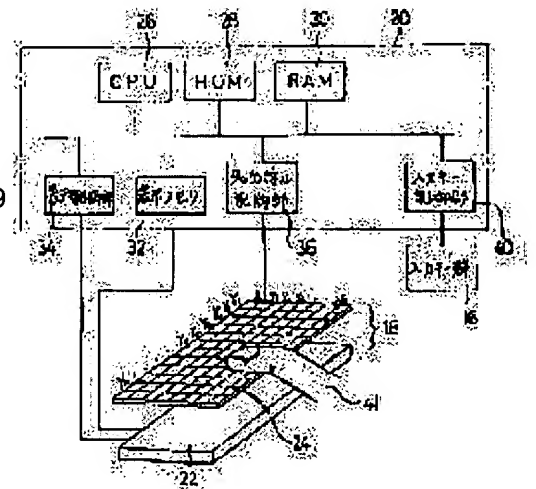
LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] this invention relates to touch input technology especially with respect to the information display equipped with the so-called touch-panel function.
[0002]
[Description of the Prior Art] Conventionally an information display as improvement in operability, and one of the input methods which used image display for small and lightweight-izing The coordinate input unit which becomes the display screens which are the display meanses of an information display, such as CRT and LCD, from many touch switches of the shape of a matrix transparent as an input means is arranged in piles. That into which an operator inputs information, such as a picture and a character, is produced commercially by contacting the front face of the coordinate input unit with a finger, a pen, etc.
[0003] As equipments, such as this, are shown for example, in a JP,2-26239,U official report When an operator contacts with a finger, a pen, etc., the coordinate input unit which the item in which a selection input is possible was divided to some fields on the display screen, was displayed, and was arranged in the front face of the field in piles An item to choose is made into a selectable state, and after that, if a finger, a pen, etc. are detached from the contact surface, it will be made to change into a definite state from a selectable state.
[0004] Or the item which an operator wants to contact and to choose with a finger, a pen, etc. is made into a selectable state, and the equipment which will be changed into a definite state from a selectable state if it contacts with a finger, a pen, etc. again after that is also known by separating a finger, a pen, etc. from the contact surface at once.
[0005]
[Problem(s) to be Solved by the Invention] However, the method of making an item a selectable state and changing into a definite state from a selectable state by separating a finger and a pen from the contact surface after that, when an operator contacts with a finger, a pen, etc. has the fault that such operation sometimes will not get used with an operator's feeling, and will detach a finger and a pen carelessly, and will carry out the mistaken input primarily.
[0006] Moreover, when an operator contacts with a finger, a pen, etc., for every contact, it is easy to generate the so-called chattering etc., and the method of making an item a selectable state and changing into a definite state from a selectable state by contacting again after that has the fault of inputting multiple times regardless of one's volition.
[0007] this invention aims at offering the information display which can change selections into a definite state by changing selections into a selection state and depressing the selections strongly of one's volition further by being made in order to solve the trouble mentioned above, and pressing touch meanses, such as a finger and a pen, against a touch switch lightly.
[0008]
[Means for Solving the Problem] In order to attain this purpose, the information display of this invention In the information display equipped with the display means equipped with the screen which displays information, such as a picture and a character, and the touch switch of a large number which are arranged on the screen of the display means and output a signal by touch operation by touch meanses, such as a finger and a pen The aforementioned display item is changed into a selection state by carrying out touch operation of a certain display item currently displayed on the screen of the aforementioned display means under by predetermined touch strength by the aforementioned touch means. And it has the touch strength detection means which changes the display item of the aforementioned selection state into a definite state by carrying out touch operation of the display item of the selection state above touch strength further predetermined [aforementioned].
[0009] Moreover, the aforementioned predetermined touch strength sets up by the number of the touch switches simultaneously outputted in a signal by the touch operation by the aforementioned touch means, the aforementioned touch strength detection means changes the aforementioned display item into a selection state, when the number of the aforementioned touch switches is under a predetermined number, and when the number of the aforementioned touch switches is more than a predetermined number, you may be made to change the display item of the aforementioned selection state into a definite state.
[0010]
[Function] By carrying out touch operation of a certain display item displayed on the screen of a display means under by predetermined touch strength by the aforementioned touch means according to the information-display input unit of this invention which has the aforementioned composition The aforementioned touch strength detection means changes the aforementioned display item into a selection state, and this touch strength detection means changes the aforementioned display item into a definite state by [which carry out touch operation of the display item above touch strength further predetermined / aforementioned] carrying out.
[0011] Moreover, if it sets up with the number of the touch switches which output a signal simultaneously by touch operation according the aforementioned predetermined touch strength to the aforementioned touch means When the number of the touch switches in which touch operation is carried out by the touch means is under a predetermined number, the aforementioned touch strength detection means changes the aforementioned display item into a selection state. And when the number of the touch switches by which touch operation is carried out is more than a predetermined number, this touch strength detection means changes the display item of the aforementioned selection state into a definite state. In this case, the target display item can be defined placing a touch

means on the screen of a display means easily, and tracing the accuracy of defining correctly the display item for the purpose of selection, and operating it from the beginning without needing term ******, and the display item can be made to decide by easy operation of carrying out touch operation of the display item still more strongly here.
[0012]
[Example] Below, one example which materialized this invention is explained with reference to a drawing. Drawing 1 is the appearance perspective diagram of the information display 10 of this example.
[0013] The information display 10 consists of a liquid crystal display display unit 18 which is one apparatus display-input equipment which is formed in the input key group 16 which is prepared before the upper surface of the main part 12, and consists of two or more function key 14 grades, and the upper surface of a main part 12, and can carry out a screen display of the information, such as a picture and a character, and a data processor 20 (refer to drawing 2) built in the main part 12.
[0014] It is arranged in piles on the liquid crystal display 22 and the upper surface of a liquid crystal display 22 of the plane as a display means of this invention, and the liquid crystal display display unit 18 is constituted by the touch switch 24 of the shape of a matrix as the so-called transparent touch panel for a coordinate input in one, as shown in the electric control-block view of drawing 2 . Therefore, according to this liquid crystal display display unit 18, it has composition in which an informational screen display and the coordinate input of a display item are possible on the same screen.
[0015] As shown in drawing 2 , furthermore, the aforementioned data processor 20 CPU26 which controls the whole equipment, and ROM28 which stored required programs, such as control processing of the CPU26 RAM30 which memorizes the coordinate data inputted from the data read from the external device (not shown), or the aforementioned touch switch 24, The display memory 32 which stores the display image for displaying on the aforementioned liquid crystal display 22, It consists of the display-control section 34 for controlling the aforementioned liquid crystal display 22, a touch-panel control section 36 to which control the aforementioned touch switch 24 and a coordinate input is made to perform, and an input key control section 40 which performs control of the input key group 16.
[0016] As for example, the resistance detection method is used for the aforementioned touch switch 24 and it shows it to drawing 2 , the resistor is arranged at the fixed interval (about 0.2mm interval) in the shape of a matrix in the XY direction. And a touch position is found out by scanning the crossing (Xn and Yn) of a resistor where the touch switch 24 corresponds to the touched position if a certain position on a touch switch 24 is touched for its finger 41 by predetermined touch strength. [as a touch means] In addition, when it touches with a finger 41 as the interval of the matrix of XY coordinate is about 0.2mm and it is shown in drawing 3 for example, compared with the interval of a matrix, a touch field is large, and two or more crossings of a resistor occur. For this reason, by the case where touch operation of the touch switch 24 top is carried out lightly, and the case where touch operation is forcibly carried out with GUTSU, several n of the crossing of a resistor differs and touch strength has the composition of making selection and decision of the selections on the screen which detects and mentions several n of the crossing later.
[0017] Thus, operation of the constituted information display 10 is explained with reference to drawing 3 or drawing 5 .
[0018] On the screen of the liquid crystal display display unit 18 of an information display 10, as shown in drawing 3 , each selections of selection area A5 are displayed from the selection area A1. First, it investigates whether the crossing of the resistor by which touch operation was carried out with the finger 41 is in the touch switch 24 on the screen of the liquid crystal display display unit 18 (S1 and S show a step.). the following -- the same . Several n of a crossing judges whether it is zero (S2), there is no touch operation, and when several n of a crossing is zero (S2:YES), it returns to S1.
[0019] On the other hand, if touch operation is carried out (S2:NO), it will progress to the following step. If touch operation of the selection area A1 of the touch switch 24 upper surface is carried out by light touch strength with a finger 41, CPU26 will detect XY coordinate (Xn, Yn) by scanning based on change of the resistance of the resistor applicable to the touch position (S3). Detection of XY coordinate indicates that you make it discolored, or it is made to blink, and is in a selection state for discernment of choosing the touched selection area A1 (S4). Since the area of a certain amount of size is in the portion which a finger 41 touches simultaneously with it, as shown in drawing 3 , the crossing of two or more XY coordinates of ($X4$, $Y2$), ($X4$, $Y3$), ($X5$, $Y2$), and ($X5$, $Y3$) is stored in RAM30 (S5).
[0020] Next, as shown in drawing 3 , as a finger 41 is traced from a top to the bottom, it is moved to it, and it moves to the selection area A2 from the selection area A1. In scanning at this time, at the step of S1 to S5 mentioned above If it is made to blink, whether the inside of the selection area A2 is discolored by detecting two or more XY coordinates ($X4$, $Y7$) which the finger 41 has touched, ($X4$, $Y8$), ($X5$, $Y7$), and ($X5$, $Y8$), and storing it in RAM30 The display of the selection area A1 is simultaneously changed into the usual display from discoloration or a blink state. Thus, based on movement of a under [the upper shell of a finger 41], XY coordinate also changes one by one, it is stored in RAM30, and one by one, it changes one by one, it takes to it, and it blinks [selection area also discolors selection area and] it in **** each time.
[0021] Next, the definite state of selections is explained. In the case of this example, the predetermined touch strength for changing selections into a definite state is converted into several n of the crossing of a resistor, for example, it has set up with 8, with [several n of the crossing] eight [less than] (7 or less [i.e.,]), it is regarded as a selection state, and with [several n of a crossing] eight [or more], it has memorized to the above ROM 28 beforehand as a definite state. And the case where desired selections are made for example, into selection area A5 is explained below.
[0022] If XY coordinate also changes, it is made to move to the selections of selection area A5 by movement of a finger 41 in S1 to S4 mentioned above and touch operation of the upper surface of a touch switch 24 will be forcibly carried out with GUTSU in this position, XY coordinate changes from the coordinate of four crossings shown in drawing 3 to the coordinate of nine crossings shown in drawing 4 , and stores two or more of the crossings in RAM30 (S6). And several n of a crossing judges some (S6), and with eight [or more], CPU26 is set up as a definite state (S7), and ends the above processing. With eight [less than] (7 or less [i.e.,]), it will return to S1 and the step mentioned above will be repeated.
[0023] Down stream processing of said drawing 5 functions as a touch strength detection means of this invention.
[0024] Actually, if it may be carried out comparatively slowly, since it will be carried out almost momentarily, the selection and the definite operation to the selection area A1 - A5 which were explained above are performed by the operator according to a series of down stream processing which described above in any case.
[0025] In a place, not necessarily, as shown in drawing 3 , movement of a finger 41 has being moved [little] straightly, it has turned

at it, and it is moved in many cases. In this case, if it is a touch in the selection area A, it will be regarded as touch operation and will incorporate as input. And even if the movement of a finger 41 moves a touch switch 24 top on a lower shell (the direction of an arrow of drawing 3 is opposite direction) and it starts it from the middle of the selection area A, it is satisfactory in any way.

[0026] Moreover, since touch strength is considered to become strength, the unfamiliar person of touch operation may establish a touch strength adjustment means to adjust the touch strength.

[0027] In addition, the size of the finger 42 in drawing 3 and drawing 4 and the interval of the shape of a matrix of the resistor of a touch switch 24 are not scales.

[0028] Deformation various in not the thing limited to the aforementioned example of this invention but the range which does not deviate from the meaning, and improvement are possible. For example, in this example, as a touch means, although the finger 41 is used, you may use projections, such as a pen, as a touch means.

[0029] Moreover, although several n of the crossing where it was touched in the touch switch 24 adopted the composition judged by whether to be [many] or it is few to the predetermined number as a touch strength detection means of this invention in the aforementioned example Are good also as composition which the press force when touching a touch switch 24 outside this judges by whether it is large or small to a predetermined pressure. Or the resistance when touching a touch switch 24 using a pressure-sensitive resistance means to detect a pressure electrically as change of resistance is good also as composition judged by whether it is large or small to predetermined resistance.

[0030]

[Effect of the Invention] the Ming kana since it explained above -- according to the information display of this invention, it can change into a definite state from a selection state by moving a touch means on the front face of a touch switch like by changing selections into a selection state and depressing the selected item strongly of one's volition further Therefore, the target display item can be defined placing the aforementioned touch means on the front face of a touch switch easily, and tracing it without paying attention specially, and selection decision of the display item can be carried out easily.

[Translation done.]

(51)Int.Cl.⁶		識別記号	庁内整理番号	FI			技術表示箇所
G06F	3/033	360	7208−5E	G06F	3/033		360B
			7208−5E				360P
	3/03	345			3/03		345A

審査請求　未請求　請求項の数2　OL　（全 6 頁）

(54)【発明の名称】　情報表示装置

(57)【要約】

【目的】　タッチスイッチに指やペン等のタッチ手段を軽く押し当てることにより、選択項目を選択状態にし、さらに、その選択項目を自分の意志で強く押し下げることにより、選択項目を確定状態にすることができる情報表示装置を提供することである。

【構成】　画像、文字等の情報を表示する液晶ディスプレイ２２と、その液晶ディスプレイ２２の画面上に配置され、手指４１によるタッチ操作に応じた信号を出力するタッチスイッチ２４とを備え、手指４１によってタッチスイッチの表面上を接触しながら移動させて、選択項目を選択状態にし（Ｓ１〜Ｓ５）、そして、その選択項目を所定のタッチ強さ以上でタッチ操作することにより、その選択項目を確定状態にする（Ｓ６、Ｓ７）。

1
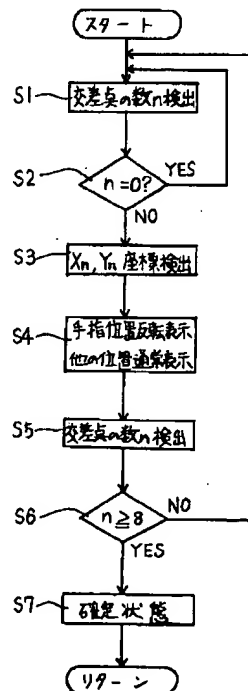
【特許請求の範囲】
【請求項1】　画像、文字等の情報を表示する画面を備えた表示手段と、その表示手段の画面上に配置され、指やペン等のタッチ手段によるタッチ操作によって信号を出力する多数のタッチスイッチとを備えた情報表示装置において、
前記表示手段の画面に表示されているある表示項目を前記タッチ手段によって所定のタッチ強さ未満でタッチ操作することにより前記表示項目を選択状態にし、かつその選択状態の表示項目をさらに前記所定のタッチ強さ以上でタッチ操作することにより前記選択状態の表示項目を確定状態にするタッチ強さ検出手段を備えたことを特徴とする情報表示装置。
【請求項2】　前記所定のタッチ強さは、前記タッチ手段によるタッチ操作によって同時に信号を出力するタッチスイッチの数によって設定し、
前記タッチ強さ検出手段は、前記タッチスイッチの数が所定数未満の場合に前記表示項目を選択状態にし、かつ前記タッチスイッチの数が所定数以上の場合に前記選択状態の表示項目を確定状態にすることを特徴とする請求項1に記載の情報表示装置。
【発明の詳細な説明】
【0001】
【産業上の利用分野】本発明は、所謂タッチパネル機能を備えた情報表示装置に係わり、特に、タッチ入力技術に関するものである。
【0002】
【従来の技術】従来、情報表示装置は、操作性の向上や、小型・軽量化のために、画像表示を利用した入力方法の一つとして、情報表示装置の表示手段であるCRTやLCD等の表示画面に、入力手段として透明なマトリックス状の多数のタッチスイッチからなる座標入力装置を重ねて配設し、その座標入力装置の表面を、指やペン等で接触することにより、操作者が画像や文字等の情報を入力するものが製品化されている。
【0003】これ等の装置は、例えば、実開平2−26239公報に示されるように、選択入力可能な項目が表示画面上にいくつかの領域に分割されて表示され、その領域の表面に重ねて配設された座標入力装置を、操作者が指やペン等で接触することにより、選択したい項目を選択可能な状態とし、その後に、その接触面より指やペン等を離すと、選択可能状態から確定状態にするようにしたものである。
【0004】または、操作者が指やペン等で接触して選択したい項目を選択可能な状態とし、そして、指やペン等を接触面から一度離し、その後に、再度、指やペン等で接触すると、選択可能状態から確定状態にする装置も知られている。
【0005】
【発明が解決しようとする課題】しかしながら、操作者

2

が指やペン等で接触することにより、項目を選択可能な状態とし、その後、指やペンを接触面から離すことにより選択可能状態から確定状態にする方法は、そもそも、このような動作が、時として操作者の感覚となじまず、かつ、不用意に指やペンを離してしまい、誤った入力をしてしまうという欠点がある。
【0006】また、操作者が指やペン等で接触することにより、項目を選択可能な状態とし、その後に、再度、接触することにより選択可能状態から確定状態にする方法は、接触毎に、所謂チャタリング等が発生しやすく、自分の意志とは無関係に複数回の入力をしてしまうという欠点がある。
【0007】本発明は、上述した問題点を解決するためになされたものであり、タッチスイッチに指やペン等のタッチ手段を軽く押し当てることにより、選択項目を選択状態にし、さらに、その選択項目を自分の意志で強く押し下げることにより、選択項目を確定状態にすることができる情報表示装置を提供することを目的としている。
【0008】
【課題を解決するための手段】この目的を達成するために、本発明の情報表示装置は、画像、文字等の情報を表示する画面を備えた表示手段と、その表示手段の画面上に配置され、指やペン等のタッチ手段によるタッチ操作によって信号を出力する多数のタッチスイッチとを備えた情報表示装置において、前記表示手段の画面に表示されているある表示項目を前記タッチ手段によって所定のタッチ強さ未満でタッチ操作することにより前記表示項目を選択状態にし、かつその選択状態の表示項目をさらに前記所定のタッチ強さ以上でタッチ操作することにより前記選択状態の表示項目を確定状態にするタッチ強さ検出手段を備えている。
【0009】また、前記所定のタッチ強さは、前記タッチ手段によるタッチ操作によって同時に信号を出力するタッチスイッチの数によって設定し、前記タッチ強さ検出手段は、前記タッチスイッチの数が所定数未満の場合に前記表示項目を選択状態にし、かつ前記タッチスイッチの数が所定数以上の場合に前記選択状態の表示項目を確定状態にするようにしてもよい。
【0010】
【作用】前記の構成を有する本発明の情報表示入力装置によれば、表示手段の画面に表示されたある表示項目を前記タッチ手段によって所定のタッチ強さ未満でタッチ操作することにより、前記タッチ強さ検出手段は、前記表示項目を選択状態にし、そして、その表示項目をさらに前記所定のタッチ強さ以上でタッチ操作することにより、同タッチ強さ検出手段は、前記表示項目を確定状態にする。
【0011】また、前記所定のタッチ強さを、前記タッチ手段によるタッチ操作によって同時に信号を出力する

タッチスイッチの数により設定しておけば、タッチ手段によってタッチ操作されるタッチスイッチの数が所定数未満の場合に前記タッチ強さ検出手段が前記表示項目を選択状態にし、かつタッチ操作されるタッチスイッチの数が所定数以上の場合に同タッチ強さ検出手段が前記選択状態の表示項目を確定状態にする。この場合、最初から選択目的の表示項目を正確に定めて操作するという正確性を期す配慮を必要とすることなく、タッチ手段を無造作に表示手段の画面上に置いてなぞりながら目的の表示項目を定めることができ、ここでその表示項目をさらに強くタッチ操作するという簡単な操作によってその表示項目を確定させることができる。

【0012】

【実施例】以下に、本発明を具体化した一実施例を図面を参照して説明する。図1は本実施例の情報表示装置10の外観斜視図である。

【0013】情報表示装置10は、その本体12の上面の手前に設けられ、かつ複数の機能キー14等からなる入力キー群16と、本体12の上面に設けられ、かつ画像や文字等の情報を画面表示できる一体型表示入力装置である液晶表示ディスプレイ装置18と、本体12に内蔵されたデータ処理装置20（図2参照）とから構成されている。

【0014】液晶表示ディスプレイ装置18は、図2の電気的制御ブロック図に示すように、本発明の表示手段としての平面状の液晶ディスプレイ22と、その液晶ディスプレイ22の上面に重ねて配置され、かつ座標入力用の透明な所謂タッチパネルとしてのマトリックス状のタッチスイッチ24とによって一体的に構成される。従って、この液晶表示ディスプレイ装置18によれば、同一画面上で情報の画面表示と、表示項目の座標入力とが可能な構成となっている。

【0015】さらに、図2に示すように、前記データ処理装置20は、装置全体を制御するCPU26と、そのCPU26の制御処理などの必要なプログラムを格納したROM28と、外部装置（図示せず）から読み込まれたデータや前記タッチスイッチ24から入力された座標データ等を記憶するRAM30と、前記液晶ディスプレイ22に表示するための表示イメージを格納する表示メモリ32と、前記液晶ディスプレイ22を制御するための表示制御部34と、前記タッチスイッチ24を制御して座標入力を行わせるタッチパネル制御部36と、入力キー群16の制御を行う入力キー制御部40とから構成されている。

【0016】前記タッチスイッチ24は、例えば、抵抗値検出方式を採用しており、図2に示すように、XY方向に抵抗体がマトリックス状に一定間隔（約0.2mm間隔）で配置されている。そして、そのタッチスイッチ24は、タッチ手段としての自分の手指41を所定のタッチ強さでタッチスイッチ24上のある位置をタッチす

ると、そのタッチした位置に該当する抵抗体の交差点（XnとYn）がスキャンニングされることにより、タッチ位置が見いだされる。なお、XY座標のマトリクスの間隔は、約0.2mmとなっており、図3に示されるように、例えば手指41でタッチした場合にはマトリクスの間隔に比べてタッチ領域が大きく、抵抗体の交差点が複数発生する。このため、タッチ強さは、タッチスイッチ24上を軽くタッチ操作した場合と、グッと力強くタッチ操作した場合とでは、抵抗体の交差点の数nが異なり、その交差点の数nを検出し、後述する画面上の選択項目の選択や確定を行う構成になっている。

【0017】このように構成された情報表示装置10の動作について図3乃至図5を参照して説明する。

【0018】情報表示装置10の液晶表示ディスプレイ装置18の画面上には、図3に示されるように、選択エリアA1から選択エリアA5の各々の選択項目が表示されている。先ず、液晶表示ディスプレイ装置18の画面上のタッチスイッチ24の中に手指41によってタッチ操作された抵抗体の交差点があるか調べる（S1、Sはステップを示す。以下同様）。交差点の数nがゼロか否かを判断し（S2）、タッチ操作がなく交差点の数nがゼロの場合（S2：YES）、S1に戻る。

【0019】一方、タッチ操作されていると（S2：NO）、次のステップに進む。手指41により軽いタッチ強さでタッチスイッチ24上面の選択エリアA1をタッチ操作すると、CPU26は、スキャンニングにより、そのタッチ位置に該当する抵抗体の抵抗値の変化に基づき、XY座標（Xn，Yn）を検出する（S3）。XY座標を検出すると、そのタッチしている選択エリアA1を選択されているという識別のため、色変わりさせるか、点滅させて選択状態にあることを表示する（S4）。それと同時に、手指41のタッチする部分にある程度の大きさの面積があるため、図3に示されるように、（X4，Y2）、（X4，Y3）、（X5，Y2）、（X5，Y3）の複数のXY座標の交差点をRAM30に格納する（S5）。

【0020】次に、図3に示すように、手指41を上から下になぞるようにして移動させ、選択エリアA1から選択エリアA2に移動する。この時のスキャンニングにおいて、前述したS1からS5のステップにて、手指41がタッチしている複数のXY座標（X4，Y7）、（X4，Y8）、（X5，Y7）、（X5，Y8）を検出し、それをRAM30に格納し、選択エリアA2内を色変わりさせるか点滅させると、同時に選択エリアA1の表示を色変わりもしくは点滅状態から通常の表示に変える。このようにして、手指41の上から下への移動に基づき、選択エリアが順次変わっていき、それに連れてXY座標も、順次、変わり、その都度、RAM30に格納され、選択エリアも順次、色変わりさせれるか点滅する。

5

【0021】次に、選択項目の確定状態を説明する。本実施例の場合、選択項目を確定状態にするための所定のタッチ強さを抵抗体の交差点の数nに換算して、例えば、8と設定してあり、その交差点の数nが8未満、つまり、7以下であれば選択状態と見なし、かつ交差点の数nが8以上であれば確定状態として、予め、前記ROM28に記憶してある。そして、所望の選択項目を、例えば、選択エリアA5とした場合を以下に説明する。

【0022】前述したS1からS4にて、手指41の移動により、XY座標も変わり、選択エリアA5の選択項目まで移動させたら、この位置でタッチスイッチ24の上面をグッと力強くタッチ操作すると、XY座標は、図3に示す4交差点の座標から、図4に示す9交差点の座標に変化し、その複数の交差点をRAM30に格納する（S6）。そして、交差点の数nがいくつかを判断し（S6）、8以上であれば、CPU26は、確定状態として設定し（S7）、以上の処理を終了する。もしも、8未満、つまり、7以下であれば、S1に戻り、前述したステップを繰り返すことになる。

【0023】前記した図5の処理工程は、本発明のタッチ強さ検出手段として機能する。

【0024】以上説明した選択エリアA1〜A5に対する選択及び確定操作は、実際、操作者によって、比較的ゆっくり行われることもあれば、殆ど瞬間的に行われることもあり、いずれの場合も前記した一連の処理工程に従って行われる。

【0025】処で、手指41の移動は必ずしも、図3に示したように、まっすぐに移動されることが少なく、曲がって移動されることが多い。この場合、選択エリアA内でのタッチであれば、タッチ操作と見なし、入力情報として取り込む。そして、手指41の動きは、タッチスイッチ24上を下から上（図3の矢印方向とは反対方向）に移動させても、選択エリアAの途中からスタートさせてもなんら問題はない。

【0026】また、タッチ操作の不慣れの人は、タッチ強さが強めになると考えられるので、そのタッチ強さを調整するタッチ強さ調整手段を設けてもよい。

【0027】なお、図3及び図4における手指42の大きさと、タッチスイッチ24の抵抗体のマトリックス状の間隔とは、比例尺でない。

【0028】本発明の前記実施例に限定されるものでなく、その趣旨を逸脱しない範囲で種々の変形、改良が可

6

能である。例えば、本実施例では、タッチ手段として、手指41を使用しているが、ペン等の突起物をタッチ手段として使用してもよい。

【0029】また、前記実施例では、本発明のタッチ強さ検出手段として、タッチスイッチ24のタッチされた交差点の数nが所定数に対して多いか少ないかにより判断する構成を採用したが、この外、例えば、タッチスイッチ24をタッチしたときの押圧力が所定の圧力に対して大きいか小さいかによって判断する構成としてもよく、あるいは、圧力を抵抗値の変化として電気的に検出する感圧抵抗手段を用いて、タッチスイッチ24をタッチしたときの抵抗値が所定の抵抗値に対して大きいか小さいかによって判断する構成としてもよい。

【0030】

【発明の効果】以上説明したことから明かなように、本発明の情報表示装置によれば、タッチ手段をタッチスイッチの表面上にて移動させることにより、選択項目を選択状態にし、さらに、その選択された項目を自分の意志で強く押し下げることにより、選択状態から確定状態にすることができる。従って、特別に注意を払うことなく、前記タッチ手段を無造作にタッチスイッチの表面上に置いてなぞりながら目的の表示項目を定めることができ、その表示項目を容易に選択確定させることができる。

【図面の簡単な説明】

【図1】本実施例の情報表示装置の外観斜視図である。

【図2】本装置の電気的制御構成を示すブロック図である。

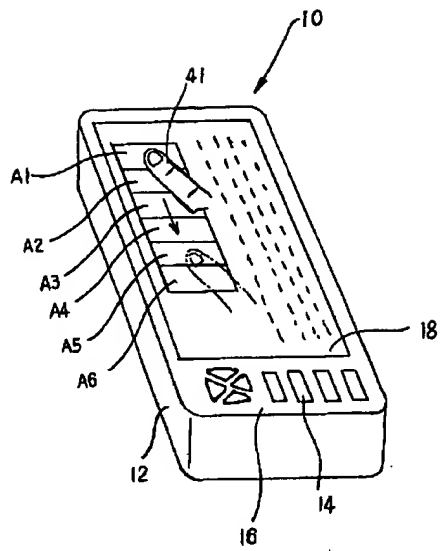【図3】タッチスイッチ上の座標と手指の移動との関係を示す説明図である。

【図4】タッチスイッチ上の座標と選択項目の選択確定状態を示す説明図である。
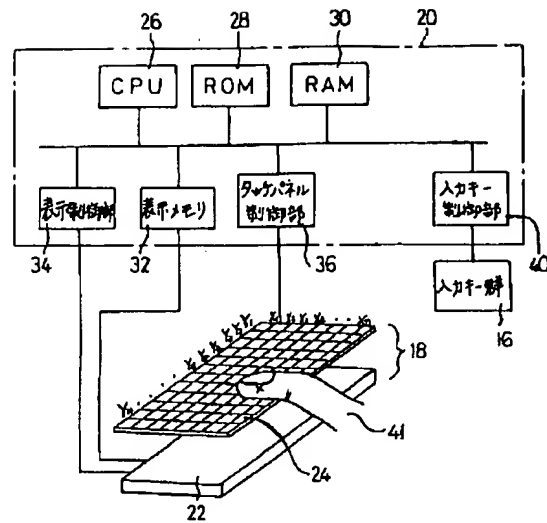
【図5】選択項目の選択及び確定状態に関するフローチャートである。

【符号の説明】

10　情報表示装置

18　液晶表示ディスプレイ装置
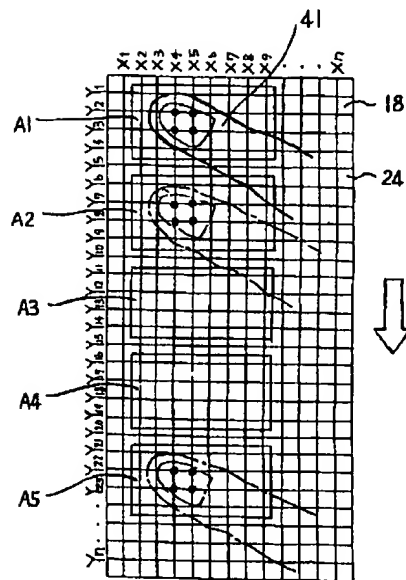
20　データ処理装置

22　液晶ディスプレイ

24　タッチスイッチ

26　CPU

41　手指

【図1】

【図2】
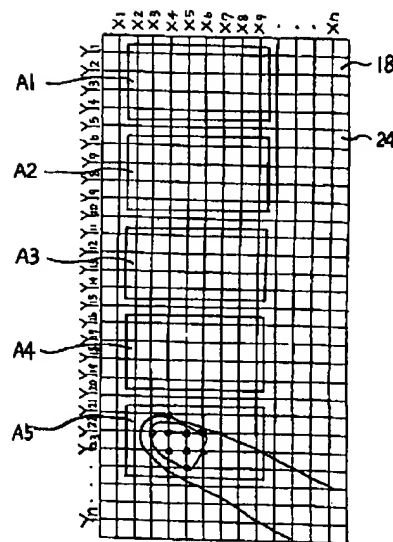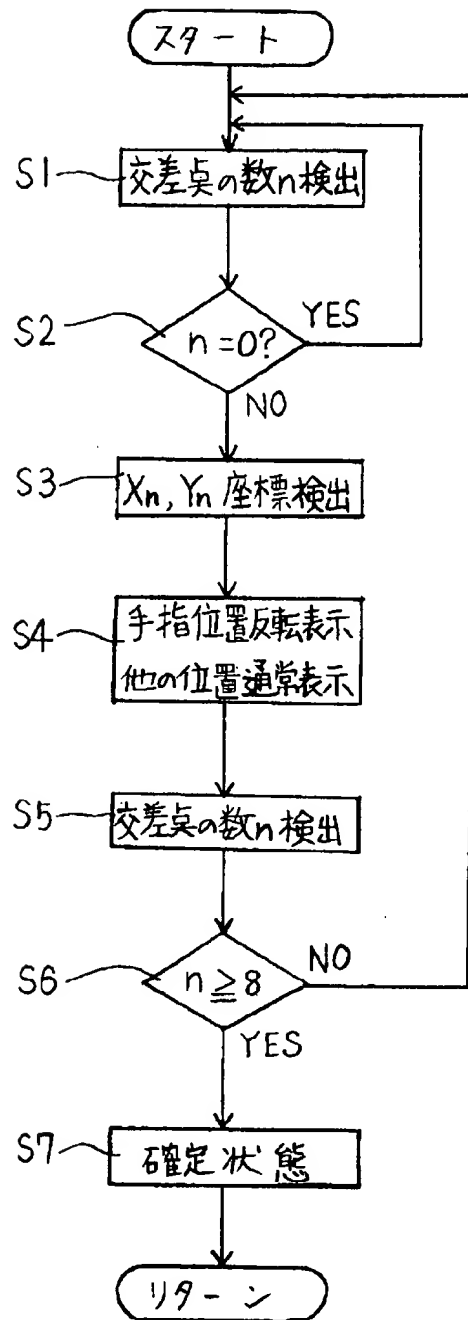
【図3】

【図4】

【図5】

```
            ┌──────────┐
            │  スタート  │
            └────┬─────┘
                 │
                 ▼◄─────────────────┐
      S1 ──── ┌──────────────┐      │
              │ 交差点の数n検出 │◄─┐  │
              └──────┬───────┘   │  │
                     ▼           │  │
                  ╱─────╲   YES  │  │
      S2 ────    ╱ n＝0? ╲───────┘  │
                 ╲       ╱          │
                  ╲─────╱           │
                     │ NO           │
                     ▼              │
      S3 ──── ┌──────────────┐      │
              │ Xn,Yn 座標検出 │      │
              └──────┬───────┘      │
                     ▼              │
      S4 ──── ┌──────────────┐      │
              │ 手指位置反転表示 │      │
              │ 他の位置通常表示 │      │
              └──────┬───────┘      │
                     ▼              │
      S5 ──── ┌──────────────┐      │
              │ 交差点の数n検出 │      │
              └──────┬───────┘      │
                     ▼              │
                  ╱─────╲    NO     │
      S6 ────    ╱ n≧8  ╲──────────┘
                 ╲      ╱
                  ╲────╱
                     │ YES
                     ▼
      S7 ──── ┌──────────────┐
              │   確定状態    │
              └──────┬───────┘
                     ▼
              ┌──────────┐
              │  リターン  │
              └──────────┘
```

* NOTICES *

Japan Patent Office is not responsible for any

damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.**** shows the word which can not be translated.

3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to touch input technology especially with respect to the information display equipped with the so-called touch panel function.

[0002]

[Description of the Prior Art] Conventionally an information display as improvement in operability, and one of the input methods which used image display for small and lightweight-izing The coordinate input unit which consists of many touch switches of the shape of a matrix transparent as an input means is arranged in the display screens which are the display means of an information display, such as CRT and LCD, in piles. That into which an operator inputs information, such as an image and an alphabetic character, is produced commercially by contacting the front face of the coordinate input unit with a finger, a pen, etc.

[0003] As equipments, such as this, are shown for example, in a JP,2-26239,U official report When an operator contacts with a finger, a pen, etc., the coordinate input unit which the item in which a selection input is possible was divided to some fields on the display screen, was displayed, and was arranged in the front face of the field in piles An item to choose is made into a selectable condition, and after that, if a finger, a pen, etc. are detached from the contact surface, it will be made to change into a definite condition from a selectable condition.

[0004] Or the item which an operator wants to contact and to choose with a finger, a pen, etc. is made into a selectable condition, and the equipment which will be changed into a definite condition from a selectable condition if it contacts with a finger, a pen, etc. again after that is also known by separating a finger, a pen, etc. from the contact surface once.

[0005]

[Problem(s) to be Solved by the Invention] However, the method of making an item a selectable condition and changing into a definite condition from a selectable condition by separating a finger and a pen from the contact surface after that, when an operator contacts with a finger, a pen, etc. has the defect that such actuation sometimes will not get used with an operator's

sensation, and will detach a finger and a pen carelessly, and will carry out the mistaken input primarily.

[0006] Moreover, when an operator contacts with a finger, a pen, etc., for every contact, it is easy to generate the so-called chattering etc., and the method of making an item a selectable condition and changing into a definite condition from a selectable condition by contacting again after that has the defect of inputting multiple times regardless of one's volition.

[0007] This invention aims at offering the information display which can change selections into a definite condition by changing selections into a selection condition and depressing the selections strongly of one's volition further by being made in order to solve the trouble mentioned above, and pressing touch means, such as a finger and a pen, against a touch switch lightly.

[0008]
[Means for Solving the Problem] In order to attain this object, an information display of this invention In an information display equipped with a display means equipped with a screen which displays information, such as an image and an alphabetic character, and a touch switch of a large number which are arranged on a screen of the display means and output a signal by touch actuation by touch means, such as a finger and a pen Said display item is changed into a selection condition by carrying out touch actuation of a certain display item currently displayed on a screen of said display means by the following in predetermined touch strength with said touch means. And it has a detection means in touch strength which changes a display item of said selection condition into a definite condition by carrying out touch actuation of the display item of the selection condition above in said predetermined touch strength further.

[0009] Moreover, said predetermined touch strength is set up with the number of touch switches which output a signal simultaneously by touch actuation by said touch means, a detection means changes said display item into a selection condition, when the number of said touch switches is under a predetermined number in said touch strength, and when the number of said touch switches is more than a predetermined number, it may be made to change a display item of said selection condition into a definite condition.

[0010]
[Function] By carrying out touch actuation of a certain display item displayed on the screen of a display means by the following in predetermined touch strength with said touch means according to the information-display input unit of this invention which has the aforementioned configuration A detection means changes said display item into a selection condition in said touch strength, and a detection means changes said display item into a definite condition in this touch strength by [which carry out touch actuation of the display item above in said predetermined touch strength further] carrying out.

[0011] Moreover, if it sets up by the number of the touch switches which output in a signal simultaneously by touch actuation according said predetermined touch strength to said touch

means, when the number of the touch switches by which touch actuation is carried out by a detection means changing said display item into a selection condition in said touch strength when the number of the touch switches by which touch actuation is carried out with a touch means is under a predetermined number is more than a predetermined number, a detection means will change the display item of said selection condition into a definite condition in this touch strength. In this case, the target display item can be defined placing a touch means on the screen of a display means easily, and tracing the accuracy of setting the display item for the purpose of selection to accuracy, and operating it from the beginning without needing term ******, and that display item can be made to decide by easy actuation of carrying out touch actuation of that display item still more strongly here.

[0012]
[Example] Below, one example which materialized this invention is explained with reference to a drawing. Drawing 1 is the appearance perspective diagram of the information display 10 of this example.

[0013] The information display 10 consists of a liquid crystal display display unit 18 which is an one apparatus display input unit which is prepared in the input key group 16 which is prepared before the upper surface of the main part 12, and consists of two or more function key 14 grades, and the upper surface of a main part 12, and can carry out a screen display of the information, such as an image and an alphabetic character, and a data processor 20 (refer to drawing 2) built in the main part 12.

[0014] It is arranged in piles on the upper surface of the plane liquid crystal display 22 as a display means of this invention, and its liquid crystal display 22, and the liquid crystal display display unit 18 is constituted by the touch switch 24 of the shape of a matrix as the so-called transparent touch panel for a coordinate input in one, as shown in electric control-block drawing of drawing 2 . Therefore, according to this liquid crystal display display unit 18, it has composition in which an informational screen display and the coordinate input of a display item are possible on the same screen.

[0015] As shown in drawing 2 , furthermore, said data processor 20 CPU26 which controls the whole equipment, and ROM28 which stored required programs, such as control processing of the CPU26, RAM30 which memorizes the coordinate data inputted from the data read from the external device (not shown), or said touch switch 24, The display memory 32 which stores the display image for displaying on said liquid crystal display 22, It consists of a display and control section 34 for controlling said liquid crystal display 22, a touch panel control section 36 to which control said touch switch 24 and a coordinate input is made to perform, and an input key control section 40 which performs control of the input key group 16.

[0016] As for example, the resistance detection method is used for said touch switch 24 and it shows it to drawing 2 , the resistor is arranged at the fixed gap (about 0.2mm gap) in the shape of a matrix in the XY direction. And a touch location is found out by scanning the crossing (Xn and

Yn) of a resistor when the touch switch 24 corresponds to the touched location if a certain location on a touch switch 24 is touched for its finger 41 by predetermined touch strength. [as a touch means] In addition, when it touches with a finger 41 as the gap of the matrix of XY coordinate is about 0.2mm and it is shown in <u>drawing 3</u> for example, compared with the gap of a matrix, a touch field is large, and two or more crossings of a resistor occur. For this reason, by the case where touch actuation of the touch switch 24 top is carried out lightly, and the case where touch actuation is forcibly carried out with GUTSU, several n of the crossing of a resistor differs and touch strength has the composition of making selection and decision of the selections on the screen which detects and mentions several n of that crossing later.

[0017] Thus, actuation of the constituted information display 10 is explained with reference to <u>drawing 3</u> thru/or <u>drawing 5</u> .

[0018] On the screen of the liquid crystal display display unit 18 of an information display 10, as shown in <u>drawing 3</u> , each selections of selection area A5 are displayed from the selection area A1. First, it investigates whether the crossing of the resistor by which touch actuation was carried out with the finger 41 is in the touch switch 24 on the screen of the liquid crystal display display unit 18 (S1 and S show a step.). the following -- the same . Several n of a crossing judges whether it is zero (S2), there is no touch actuation, and when several n of a crossing is zero (S2:YES), it returns to S1.

[0019] On the other hand, if touch actuation is carried out (S2:NO), it will progress to the following step. If touch actuation of the selection area A1 of the touch switch 24 upper surface is carried out by light touch strength with a finger 41, CPU26 will detect XY coordinate (Xn, Yn) by scanning based on the resistance value change of the resistor applicable to the touch location (S3). Detection of XY coordinate indicates that you make it discolored, or it is made to blink, and is in a selection condition for discernment of choosing the touched selection area A1 (S4). Since the area of a certain amount of magnitude is in the portion in which a finger 41 touches it and coincidence, as shown in <u>drawing 3</u> , the crossing of two or more XY coordinates of (X4, Y2), (X4, Y3), (X5, Y2), and (X5, Y3) is stored in RAM30 (S5).

[0020] Next, as shown in <u>drawing 3</u> , as a finger 41 is traced from a top to the bottom, it is moved to it, and it moves to the selection area A2 from the selection area A1. In scanning at this time, at the step of S1 to S5 mentioned above If it is made to blink, whether the inside of the selection area A2 is discolored by detecting two or more XY coordinates (X4, Y7) which the finger 41 has touched, (X4, Y8), (X5, Y7), and (X5, Y8), and storing it in RAM30 The display of the selection area A1 is simultaneously changed into the usual display from discoloration or a flash condition. Thus, based on the migration from a finger 41 to the bottom, XY coordinate also changes one by one, it is stored in RAM30, and one by one, it changes one by one, it takes to it, and it blinks [selection area also discolors selection area and] it in **** each time.

[0021] Next, the definite condition of selections is explained. In the case of this example, the predetermined touch strength for changing selections into a definite condition is converted into

several n of the crossing of a resistor, for example, it has set up with 8, with [several n of the crossing] eight [less than] (7 or less [i.e.,]), it is regarded as a selection condition, and with [several n of a crossing] eight [or more], it has memorized to said ROM28 beforehand as a definite condition. And the case where desired selections are made for example, into selection area A5 is explained below.

[0022] If XY coordinate also changes, it is made to move to the selections of selection area A5 by migration of a finger 41 in S1 to S4 mentioned above and touch actuation of the upper surface of a touch switch 24 will be forcibly carried out with GUTSU in this location, XY coordinate changes from the coordinate of four crossings shown in drawing 3 to the coordinate of nine crossings shown in drawing 4 , and stores two or more of those crossings in RAM30 (S6). And several n of a crossing judges some (S6), and with eight [or more], CPU26 is set up as a definite condition (S7), and ends the above processing. With eight [less than] (7 or less [i.e.,]), return and the step mentioned above will be repeated to S1.

[0023] Down stream processing of above mentioned drawing 5 functions as a detection means in the touch strength of this invention.

[0024] If it may be carried out comparatively slowly, since it will be carried out almost momentarily, the selection and the definite actuation to the selection area A1 - A5 which were explained above are actually performed by the operator according to a series of down stream processing which described above in any case.

[0025] In a place, as migration of a finger 41 was not necessarily shown in drawing 3 , it is rare to be moved straightly, it has bent and it is moved in many cases. In this case, if it is a touch in the selection area A, it will be regarded as touch actuation and will incorporate as input. And even if a motion of a finger 41 moves a touch switch 24 top upwards (the direction of an arrow head of drawing 3 is an opposite direction) from the bottom, and it makes it start from the middle of the selection area A, it is satisfactory in any way.

[0026] Moreover, since touch strength is considered to become strength, the unfamiliar person of touch actuation may establish an adjustment means in the touch strength which adjusts the touch strength.

[0027] In addition, the magnitude of the finger 42 in drawing 3 and drawing 4 and the gap of the shape of a matrix of the resistor of a touch switch 24 are not scales.

[0028] Deformation various in the range which is not limited to said example of this invention and does not deviate from the meaning, and amelioration are possible. For example, in this example, as a touch means, although the finger 41 is used, projections, such as a pen, may be used as a touch means.

[0029] Moreover, although several n of the crossing when it was touched [strength / of this invention / touch] in the touch switch 24 as a detection means adopted the configuration judged by whether to be [many] or it is few to the predetermined number in said example Are good also as a configuration which the thrust when touching a touch switch 24 outside this judges by whether it is large or small to a predetermined pressure. Or the resistance when touching a touch switch 24 using a pressure-sensitive resistance means to detect a pressure electrically as a resistance value change is good also as a configuration judged by whether it is large or small to predetermined resistance.

[0030]
[Effect of the Invention] According to the information display of this invention, it can change into a definite condition from a selection condition by moving a touch means on the front face of a touch switch like [it is ****** from having explained above and] by changing selections into a selection condition and depressing the selected item strongly of one's volition further. Therefore, without paying attention specially, the target display item can be defined placing said touch means on the front face of a touch switch easily, and tracing it, and selection decision of the display item can be carried out easily.

[Translation done.]